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AUSTER MKs. 11. and 12.

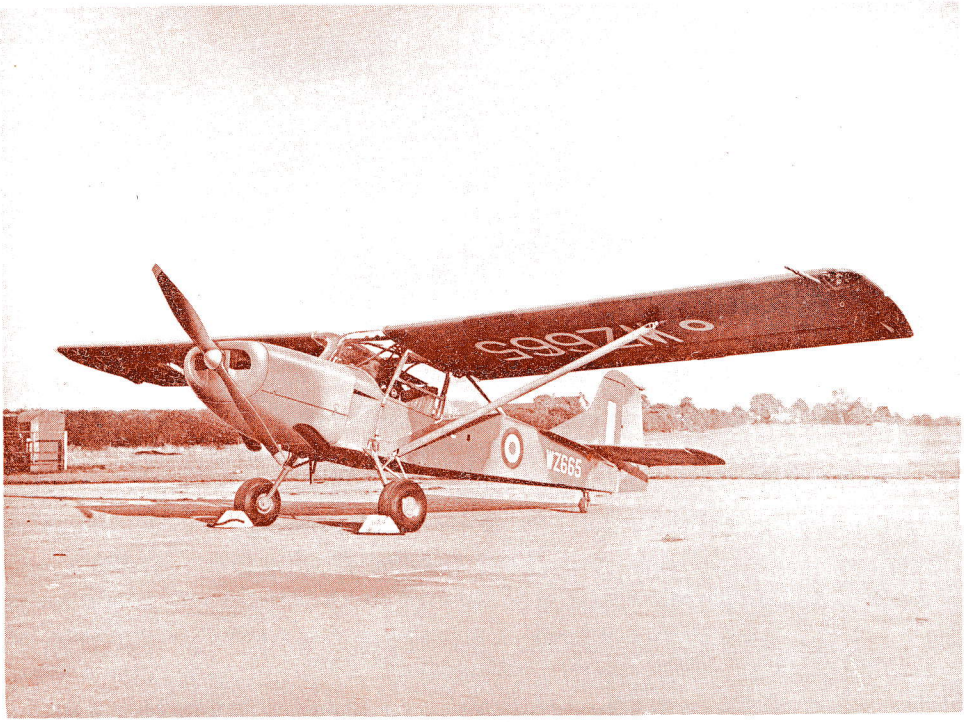
ROLLS ROYCE CONTINENTAL IO-470-D ENGINE

SPECIFICATION

BEAGLE AUSTER AIRCRAFT LTD
REARSBY LEICESTER

AUSTER
MKs. 11. and 12.

ROLLS ROYCE CONTINENTAL
IO-470-D ENGINE



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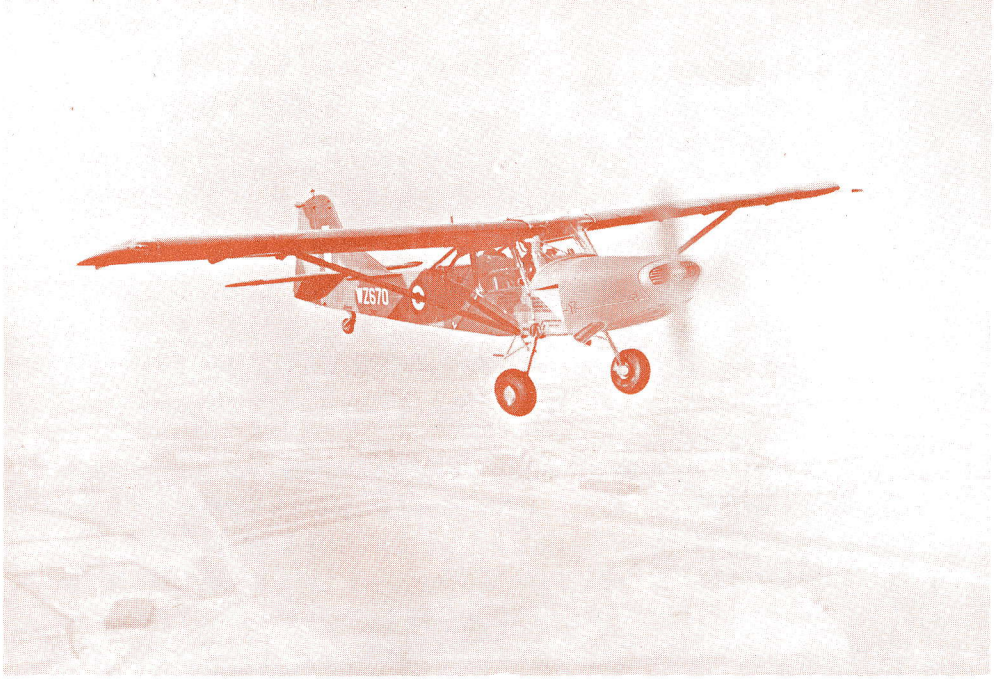


INTRODUCTION

1. Now that a new Rolls Royce-built engine of 260 h.p. is becoming available—following acquisition by Rolls Royce of the Continental Licence—an examination has been made of the merits of a re-engined Auster Mark 9. The standard aircraft is at present open to criticism as being under-powered for its purpose, especially in tropical conditions. Handling criticisms are centred round the aileron droop mechanism, which the fitting of a much more powerful engine would immediately render less necessary.

2. As a result of this examination, two alternatives have been prepared. The first scheme provides for a relatively simple re-engining of the aircraft in which the 260 h.p. Rolls Royce Continental I0-470-D, fuel injection engine would be substituted for the 180 h.p. Blackburn Bombardier, 208 engine. This version to be known as the Auster Mk. 11.

3. The second scheme involves considerable re-designingof the aircraft in order that greater advantage be taken of the extra power available, especially in regard to low speed flying characteristics. This version would be known as the Auster Mk. 12.

AUSTER MK.11

4. In this version the re-engining would result in the following advantages:

The Rolls Royce I0-470-D engine blends into the existing fuselage lines of the Auster Mk. 9 and a neat cowling-line is readily achieved. Cooling is aided by the standard exhaust-ejection system already developed by Auster Aircraft Ltd. for air top-dressing work in hot climates at low speeds. The flow of cooling air is governed by the exhaust efflux, i.e., the power setting of the engine, and is therefore largely independent of the forward speed of the aircraft. Engine starting and performance in cold weather conditions are also specially provided for. This engine embodies a wet oil sump and is less prone to oil system troubles than an installation with a separate oil tank.

5. (a) Increase in take–off power from 180 b.h.p. to 260 b.h.p. – over 50% for a weight increase of only 75 lbs. i.e. under 4% of the aircraft's all–up–weight.

(b) An increase in available cruising speed of at least 30 knots (according to load) for a sacrifice in range at 80 knots of only approximately 32 nautical miles. Gain in available cruising speed equals approximately 19%. The above is achieved with an almost negligible reduction in useful load, i.e. approximately 95 lbs., applicable only in the overload case.

(c) The improvement in performance in tropical conditions,and very high level aerodromes, is dramatic. The aircraft is transformed from one which is marginally or even dangerously underpowered when operating heavily laden in these conditions to one which has a brisk STOL performance and a big margin of safety. This is clearly shown in Appendices B and C. The initial rate of climb in tropical highland conditions at maximum all–up–weight is trebled.

(d) The approximate hours between overhaul of the engine are expected to be 1200 as compared with the present 800 hours allowed for the Bombardier.

6. Auster Aircraft Ltd. now propose that one aircraft be allotted from those at present in production under contract to the Ministry of Aviation to be fitted with the Rolls Royce 10-470-D engine, to serve for trial installation and evaluation. Completion up to test flight could at present be made in approximately four months from Instruction to Proceed.

7. Re-engining of existing aircraft could commence in approximately three months following the initial I.T.P. The turn around period would be approximately 2-3 weeks from delivery of an existing standard Mark 9 aircraft to Rearsby. A rate of two aircraft per week could be maintained or even more if required. In addition to much improved performance, the background of the engine and the very much smoother running which is its characteristic, operating costs of engine, airframe and equipment would almost certainly be reduced. Further, a new Rolls engined Mark 9 aircraft would open to us possibilities for export orders hitherto unobtainable because of the aircraft's limited performance and engine characteristics.

The following three Appendices give comparative estimated performance figures:-

Appendix A. Table of comparative performance... I.S.A. Sea Level.

Appendix B. Table of comparative performance... I.S.A. - 20°C, 5000 ft.a.m.s.l.

Appendix C. Table of comparative performance... I.S.A. - 30°C, 7000 ft.a.m.s.l.

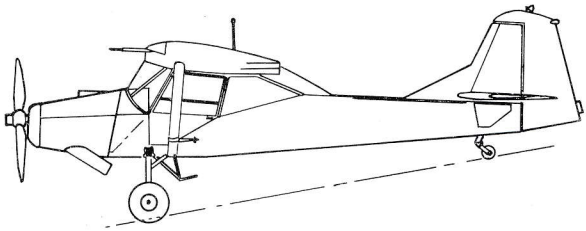
AUSTER MK. 12

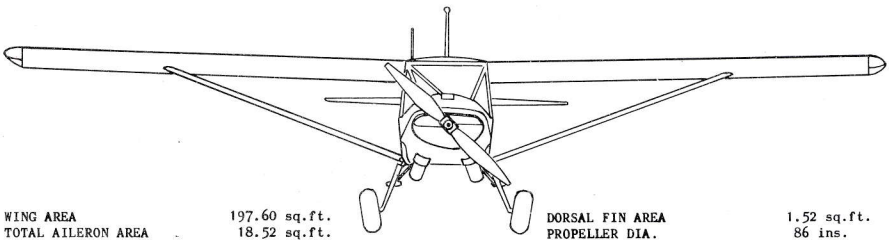
8. In this version, considerable re-designing of the aircraft has been undertaken in order further to increase the usefulness of the higher-powered engine. The mainplanes incorporate leading edge slats which, coupled with slotted flaps of an increased span, give a substantial decrease in minimum

flying speed. A re-designed empennage greatly improves general handling characteristics and provides greater longitudinal stability. In addition to these main design features, the general contours of the aircraft have been 'cleaned up' to improve all-round performance as well as appearance. The estimated figures given in Appendices D.E. and F show the advantages gained when compared with those of the standard Mark 9 aircraft now in service. The Mk. 12 would provide the Army with an aircraft of outstanding performance and handling characteristics for A.O.P., reconnaissance and communications purposes. This version may also be fitted with two rear seats, highly desirable for communications duties.

Appendices D,E and F give comparative estimated performance figures for the Mark 12 aircraft:-

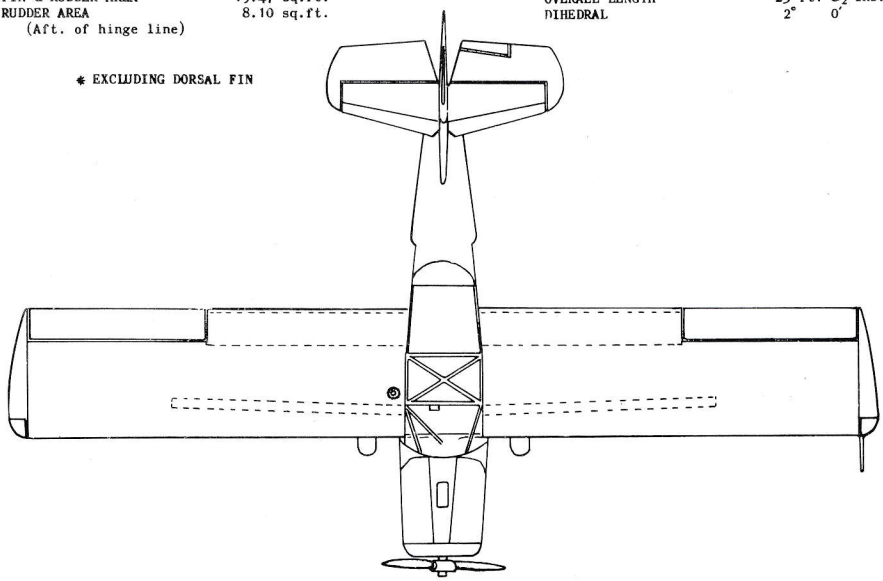
Appendix D	Table of comparative performance...	I.S.A. Sea Level.
Appendix E	Table of comparative performance...	I.S.A. - 20°C, 5000 ft.a.m.s.l.
Appendix F	Table of comparative performance...	I.S.A. - 30°C, 7000 ft.a.m.s.l.



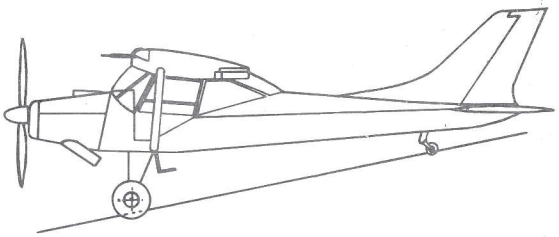


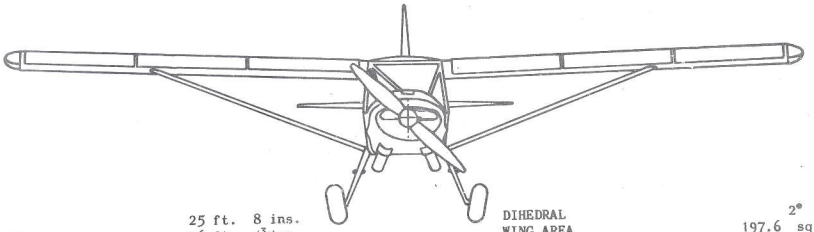
WING AREA	197.60 sq.ft.	DORSAL FIN AREA	1.52 sq.ft.
TOTAL AILERON AREA (Aft. of hinge line)	18.52 sq.ft.	PROPELLER DIA.	86 ins.
TAILPLANE & ELEVATOR AREA	30.05 sq.ft.	WING SPAN	36 ft. 4¾ ins.
ELEVATOR AREA (Aft. of hinge line)	12.25 sq.ft.	WING CHORD	5 ft. 6 ins.
* FIN & RUDDER AREA	19.47 sq.ft.	TAILPLANE SPAN	10 ft. 0 ins.
RUDDER AREA (Aft. of hinge line)	8.10 sq.ft.	WHEEL TRACK	6 ft. 8 ins.
		OVERALL LENGTH	23 ft. 8½ ins.
		DIHEDRAL	2° 0′

* EXCLUDING DORSAL FIN

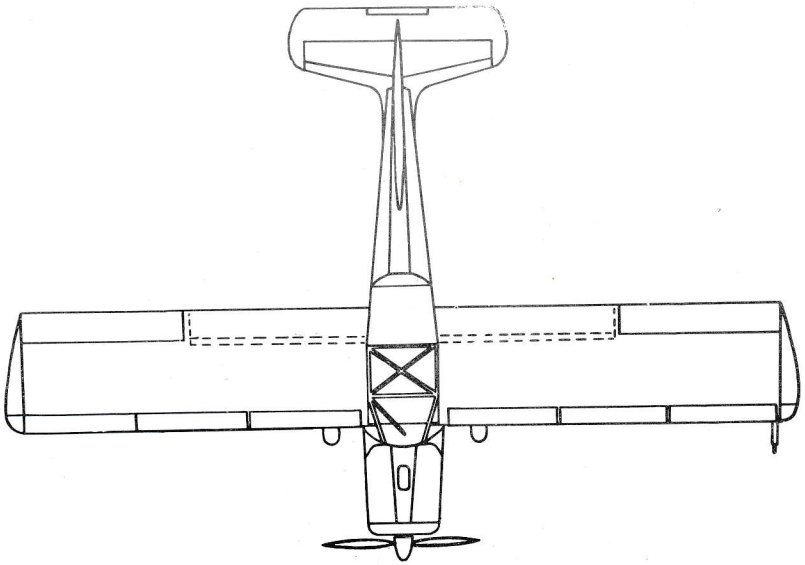


AUSTER MK.11 - GENERAL ARRANGEMENT

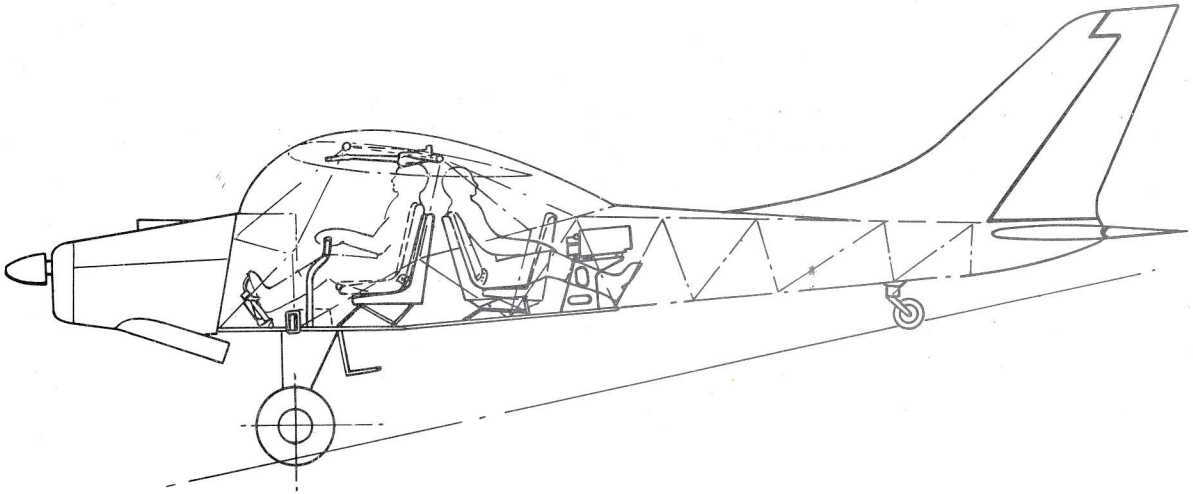




LENGTH	25 ft. 8 ins.	DIHEDRAL	2°
WING SPAN	36 ft. 4¾ ins.	WING AREA	197.6 sq. ft.
WING CHORD	5 ft. 6 ins.	TAILPLANE & ELEVATOR AREA	30.0 sq. ft.
TAILPLANE SPAN	10 ft. 0 ins.	FIN & RUDDER AREA (Less dorsal)	16.85 sq. ft.
WHEEL TRACK	7 ft. 2 ins.		



AUSTER MK 12 - GENERAL ARRANGEMENT



CABIN ARRANGEMENT

APPENDIX A

PERFORMANCE (Estimated)

I.S.A. SEA LEVEL CONDITIONS

	A.O.P.Mark 9 A: With Bombardier 180 b.h.p.engine			A.O.P.Mark 11 B: With Rolls Royce Continental IO-470-D engine of 260 b.h.p. with v.p. prop.		
	A.O.P.Min.	A.O.P.Max.	Rec/Com. Max.	A.O.P.Min.	A.O.P.Max.	Rec/Co Max.
Weight (lbs)	2047	2280	2550	2119	2352	2550
Take-off run, zero wind (yds)	129	166	215	92	117	143
Total to 50 ft.zero wind (yds)	304	371	505	179	222	268
Max.Cruise Speed (knots)	89	88	86	118	117	116
Max.Level Speed (knots)	102	101	100	135	134	133
Initial Rate of Climb (ft/min)	1010	835	650	1630	1460	1330
Endurance at 80 knots (hours)	2.7	2.5	4.6	2.4	2.3	4.2
Fuel (Imp. gallons)	15	15	30	15	15	30
Landing from 50 ft.zero wind (yds)	185	193	203	187	196	203
Landing run, zero wind (yds)	67	73	82	68	76	82

APPENDIX B

PERFORMANCE (Estimated)

5000 ft. a.m.s.l. I.S.A. + 20°C.

	A.O.P. Mark 9 A: With Bombardier 180 b.h.p.engine			A.O.P. Mark 11 B: With Rolls Royce Continental I0-470-D engine of 260 b.h.p. with v.p. prop.		
	A.O.P.Min.	A.O.P.Max.	Rec/Com. Max.	A.O.P.Min.	A.O.P.Max.	Rec/Com. Max.
Weight (lbs)	2047	2280	2550	2119	2352	2550
Take-off run, zero wind (yds)	211	265	360	160	205	253
Total to 50 ft.zero wind (yds)	495	610	825	310	390	480
Max.Cruise Speed (knots)	86	85	84	127	126	125
Max.Level Speed (knots)	100	99	98	133	132	131
Initial Rate of Climb (ft/min)	685	530	360	1200	1040	900
Endurance at 80 knots (hours)	2.5	2.3	4.2	-	-	-
Fuel (Imp. gallons)	15	15	30	15	15	30
Landing from 50 ft.zero wind (yds)	196	204	216	197	208	216
Landing run, zero wind (yds)	75	82	92	76	85	92

APPENDIX C

PERFORMANCE (Estimated)

7000 ft. a.m.s.l. I.S.A. + 30°C.

	A.O.P.Mark 9 A: With Bombardier 180 b.h.p.engine			A.O.P.Mark 11 B: With Rolls Royce Continental 10-470-D engine of 260 b.h.p. with v.p. prop.		
	A.O.P.Min.	A.O.P.Max.	Rec/Com. Max.	A.O.P.Min.	A.O.P.Max.	Rec/Com. Max.
Weight (lbs)	2047	2280	2550	2119	2352	2550
Take-off run, zero wind (yds)	259	322	440	203	263	328
Total to 50 ft. zero wind (yds)	610	755	1010	385	495	618
Max. Cruise Speed (knots)	82	80	77	126	125	124
Max. Level Speed (knots)	96	95	93	131	130	129
Initial Rate of Climb (ft/min)	560	420	250	1040	880	760
Endurance at 80 knots (hours)	2.2	1.9	3.5	-	-	-
Fuel (Imp. gallons)	15	15	30	15	15	30
Landing from 50 ft.zero wind (yds)	201	209	221	202	213	221
Landing run, zero wind (yds)	79	86	96	80	89	96

APPENDIX D

PERFORMANCE (Estimated)

I.S.A. SEA LEVEL CONDITIONS

	A.O.P. Mark 9 A: With Bombardier 180 b.h.p. engine			A.O.P. Mark 12 B: With Rolls Royce Continental IO-470-D engine of 260 b.h.p. with v.p. prop.		
	A.O.P.Min.	A.O.P.Max.	Rec/Com. Max.	A.O.P.Min.	A.O.P.Max.	Rec/Com. Max.
Weight (lbs)	2047	2280	2550	2200	2450	2600
Take-off run, zero wind (yds)	129	166	215	70	90	105
Total to 50 ft.zero wind (yds)	304	371	505	150	192	235
Max. Cruise Speed (knots)	89	88	86	114	113	112
Max. Level Speed (knots)	102	101	100	128	127	126
Initial Rate of Climb (ft/min)	1010	835	650	1560	1410	1270
Endurance at 80 knots (hours)	2.7	2.5	4.6	2.3	2.2	4.0
Fuel (Imp. gallons)	15	15	30	15	15	30
Landing from 50 ft. zero wind (yds)	185	193	203	178	187	194
Landing run, zero wind (yds)	67	73	82	62	68	74

APPENDIX E

PERFORMANCE (Estimated)

5000 ft. a.m.s.l. I.S.A. + 20°C.

	A.O.P.Mark 9 A: With Bombardier 180 b.h.p. engine			A.O.P.Mark 12 B: With Rolls Royce Continental IO-470-D engine of 260 b.h.p. with v.p. prop.		
	A.O.P.Min.	A.O.P.Max.	Rec/Com. Max.	A.O.P.Min.	A.O.P.Max.	Rec/Con Max.
Weight (lbs)	2047	2280	2550	2200	2450	2600
Take-off run, zero wind (yds)	211	265	360	128	165	190
Total to 50 ft.zero wind (yds)	495	610	825	257	340	390
Max. Cruise Speed (knots)	86	85	84	122	121	120
Max. Level Speed (knots)	100	99	98	127	126	125
Initial Rate of Climb (ft/min)	685	530	360	1100	940	840
Endurance at 80 knots (hours)	2.5	2.3	4.2	-	-	-
Fuel (Imp. gallons)	15	15	30	15	15	30
Landing from 50 ft.zero wind (yds)	196	204	216	189	197	205
Landing run, zero wind (yds)	75	82	92	70	76	83

APPENDIX F

PERFORMANCE (Estimated)

7000 ft. a.m.s.l. I.S.A. + 30°C.

	A.O.P. MARK 9 A: With Bombardier 180 b.h.p. engine			A.O.P. MARK 12 B: With Rolls Royce Continental IO-470-D engine of 260 b.h.p. with v.p. prop.		
	A.O.P.Min.	A.O.P.Max.	Rec/Com. Max.	A.O.P.Min.	A.O.P.Max.	Rec/Com. Max.
Weight (lbs)	2047	2280	2550	2200	2450	2600
Take-off run, zero wind (yds)	259	322	440	165	210	250
Total to 50 ft.zero wind (yds)	610	755	1010	340	440	520
Max. Cruise Speed (knots)	82	80	77	120	119	118
Max. Level Speed (knots)	96	95	93	125	124	123
Initial Rate of Climb (ft/min)	560	420	250	940	780	710
Endurance at 80 knots (hours)	2.2	1.9	3.5	-	-	-
Fuel (Imp. gallons)	15	15	30	15	15	30
Landing from 50 ft.zero wind (yds)	201	209	221	193	202	210
Landing run, zero wind (yds)	79	86	96	73	80	87